

WHAT IS CLAIMED IS:

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1. A display system, comprising:
a plurality of Light Emitting Diodes (LEDs) forming a display panel, at
least some of the LEDs of the display panel operable in an emit mode, and at
least some of the LEDs of the display panel operable in a sense mode;
a driving circuit adapted to couple to one of the plurality of LEDs operable
in the emit mode and structured to cause the one of the plurality of LEDs
operable in the emit mode to emit light; and
a sensing circuit adapted to couple to one of the plurality of LEDs operable
in the sense mode and structured to cause the one of the plurality of LEDs
operable in the sense mode to sense light energy.
2. The display system of claim 1 wherein at least some of the plurality
of LEDs of the display are operable in the emit mode and in the sense mode.
3. The display system of claim 1 wherein one or more of the plurality
of LEDs comprises an organic material.
4. The display system of claim 1 wherein the sensing circuit comprises
a reverse bias circuit coupled to the one of the plurality of LEDs operable in the
sense mode.
5. The display system of claim 1 wherein the sensing circuit is
structured to sense an amount of light energy received by the one of the plurality
of LEDs operable in sense mode.
6. The display system of claim 1 wherein the sensing circuit is
structured to sense an amount of light energy generated from outside the display
panel.

7. The display system of claim 1 wherein the sensing circuit is coupled to a first LED, and wherein the sensing circuit comprises:

a reverse biasing circuit coupled to a first terminal of the first LED;

and

a sensing circuit coupled to a second terminal of the first LED.

8. The display system of claim 7 wherein the sensing circuit comprises a sense amplifier.

9. The display system of claim 1 wherein the driving circuit is adapted to be coupled to a first group of LEDs operable in the emit mode while not being coupled to a second group of LEDs operable in the emit mode.

10. The display system of claim 9 wherein the first group of LEDs are all in a same row of the display panel.

11. The display system of claim 1 wherein the driving circuit is adapted to be coupled to a row of LEDs operable in the emit mode while the sensing circuit is adapted to be coupled to a row of LEDs operable in the emit mode, the row of LEDs operable in the emit mode ^{is} adjacent to the row of LEDs operable in the sense mode.²

12. The display system of claim 1, further comprising:
an LED brightness adjusting circuit coupled to both the sensing circuit and the driving circuit, and configured to modulate a brightness of an output of an LED in the display panel operable in the emit mode based on a signal received from an LED in the display panel operable in the sense mode.

13. The display system of claim 12 wherein the LED of the display panel operable in the sense mode is configured to sense light from a source external to the display panel.

14. The display system of claim 12 wherein the LED of the display panel operable in the sense mode is configured to sense light from the LED in the display panel operable in the emit mode.

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15. The display system of claim 1, further comprising:

a uniformity calibration circuit coupled to both the sensing circuit and the driving circuit, and configured to adjust the output of an LED in the display panel operable in the emit mode based on the output of another LED in the display panel operable in the emit mode that is sensed by an LED in the display operable in the sense mode.

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16. The display system of claim 15 wherein the uniformity calibration circuit is a gamma uniformity calibration circuit and is operable to adjust the output of the LED in the display panel operable in the emit mode over a range of output intensities.

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17. The display system of claim 1, further comprising:

a position circuit coupled to the sensing circuit and structured to determine a position on the display panel at which an external light source is pointing.

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18. The display system of claim 17 wherein the positional circuit is configured to compare outputs of one or more LEDs in the display panel operable in the sense mode.

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19. The display system of claim 17, further comprising an image generator coupled to the position circuit, the image generator structured to generate an image responsive to an output from the position circuit.

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20. The display system of claim 1 wherein one or more of the plurality of LEDs are Stacked Organic Light Emitting Diodes (SOLED).

21. The display system of claim 1 wherein one or more of the LEDs of the display panel operable in the sense mode are Stacked Organic Light Emitting Diodes (SOLEDs).

22. The display system of claim 21, wherein the sensing circuit comprises a plurality of separate layer sensing circuits respectively coupled to separate organic layers in the one or more SOLEDs, and wherein the sensing circuit is structured to signal from which of the separate organic layers in the one or more SOLEDs light energy is being sensed.

23. An electroluminescent display device, comprising:
a first plurality of diodes capable of producing an electroluminescent output;
a second plurality of diodes capable of sensing light energy that is directed on them;
a forward driving circuit adapted to couple a first terminal of one of the first plurality of diodes, the forward driving circuit structured to cause the one of the first plurality of diodes to produce the electroluminescent output;
a biasing circuit coupled to a first terminal of one of the second plurality of diodes, the biasing circuit structured to cause the one of the second plurality of diodes to be in a sense mode; and
a sensing circuit coupled to a second terminal of the one of the second plurality of diodes.

24. The display device of claim 23 wherein the second plurality of diodes is capable of sensing light energy that is directed on them from outside the display device.

25. The display device of claim 23 wherein at least some diodes in the first plurality of diodes are also in the second plurality of diodes.

26. The display device of claim 23 wherein the first plurality of diodes is
are arranged in a first row in the display device, and wherein the second
plurality of diodes is arranged in a second row in the display device, the first row
being adjacent to the second row.

27. The display device of claim 23 wherein at least one of the first
plurality of diodes comprises an organic layer.

28. A method for operating a display system that includes a display
device having one or more diodes structured to generate electroluminescent light,
and having one or more diodes structured to sense light energy shining on them,
the method comprising:

driving the diodes structured to generate light to cause an image to be
shown on the display device; and

measuring an amount of light energy shining on the diodes structured to
sense light energy.

29. The method of claim 28 wherein driving the diodes and measuring
an amount of light energy occurs simultaneously.

30. The method of claim 28 wherein driving the diodes occurs during a
first portion of a display cycle and wherein measuring an amount of light energy
occurs during a second portion of the display cycle.

31. The method of claim 30 wherein at least one diode is both driven in
the first portion of the display cycle and senses light energy in the second portion
of the display cycle.

32. The method of claim 28 wherein measuring an amount of light
energy comprises measuring an amount of light energy generated by driving the
diodes structured to generate light.

33. The method of claim 28, further comprising:
adjusting an overall brightness of the display device based on the amount
of light energy falling on the light sensing diodes.

5 34. The method of claim 33 wherein adjusting an overall brightness of
the display comprises modulating a signal used to drive the diodes structured to
generate light.

10 35. The method of claim 28, further comprising:
sensing an amount of light generated by a particular diode in the display
device; and
adjusting a driving signal used for driving the particular diode.

15 36. The method of claim 35 wherein adjusting a driving signal used for
driving the particular diode comprises adjusting a driving signal used for driving
the particular diode at several points along a gamma curve of the particular
diode.

20 37. The method of claim 28, further comprising detecting a position on
the display device of where an external pointing device is shining.

38. The method of claim 37 wherein the external pointing device is a
laser pointer.

25 39. The method of claim 37, further comprising generating an image on
the display device based on a signal detected from the external pointing device.

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